

## Addressing Public Concerns about Endocrine Disruptors

Stephanie Hughes, Source Control Manager  
City of Palo Alto, Environmental Compliance  
stephanie.hughes@cityofpaloalto.org  
650-617-3165

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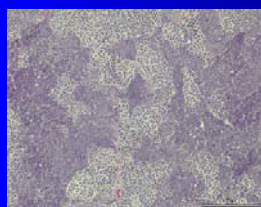
## Endocrine Disrupting Compounds (EDCs)

Chemicals that can interfere with the normal hormone function in humans and animals, controlling:

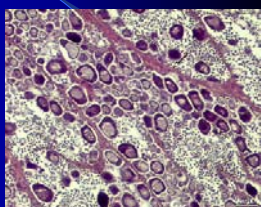
- Metabolism
- Growth
- Reproduction

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## Example: Testicular Cell Tissue



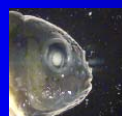
normal male flounder



intersex male flounder

Mathiesen P, Allen VT, Allchin CR, Peist SW, Kirby MP, Law RJ, Scott AD, Thain JE, Thomas RV. (1998) Oestrogenic endocrine disruption in flounder (*Platichthys flesus* L.) from United Kingdom estuarine and marine waters. Science Series, Technical Report No. 107. Centre for Environment, Fisheries and Aquaculture Science

## Secondary Sex Characteristics



male



female



Female with male characteristics

Secondary sex characteristics may also be affected by EDCs. Above left is a male fathead minnow. Above middle is a female fathead minnow. Far right is a female minnow that developed male nose markings following exposure to androgenic EDCs. (Provided by G. Ankley, U.S. EPA, Duluth, MN)

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## Examples of EDCs (known and suspected)

Prescription and non-prescription drugs	birth control pills, steroid-based medications, chemotherapy medications
Household products	detergents, surfactants, and their breakdown products
Industrial chemicals	bisphenol A, phthalates, styrenes, mercury, lead, dioxins and furans, PCBs, fire retardants
Fungicides	hexachlorobenzene, maneb, tributyltin
Herbicides	2,4-D, 2,4,5-T, atrazine
Insecticides	carbaryl, chlordane, dieldrin, lindane, parathion
Animal husbandry products	steroid-based supplements to increase milk, egg & meat production

## Status of U.S. EPA Programs

- Developing a screening and testing program for the **87,000** chemicals that have possible endocrine disrupting effects
- Developing methods to evaluate ecological community and human health effects

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## What Was Local Issue?

- Local water reuse opportunities
  - Reused water likely to contain low-concentration soup of EDCs
  - Might there be environmental and/or human health impacts of some uses?
- There was a need to identify and address concerns as a group, out in the open

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## How Did We Address Concerns?

- Used existing collaborative process (WMI)
  - Formed EDC Workgroup under WMI umbrella
- Workgroup chaired by agency that was not immediately in the reuse hot seat
- Listed all public concerns
  - Even when there was disagreement re. validity
- Identified “experts” to speak to these concerns
- As a group, drafted document of findings

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## Santa Clara Basin Watershed Management Initiative (WMI)



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## Introduction to WMI

- Started by USEPA & Regional Board in 1996
- Mission: “To protect & enhance the watershed, creating a sustainable future for the community and the environment.”
- Stakeholders
  - Cities, towns, Santa Clara County, the Water District, and Valley Transportation Authority
  - State and Federal regulatory & resource agencies
  - Urban Runoff Pollution Prevention Program
  - Environmental advocates, citizens groups & business interests

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## Initiating the EDC Workgroup

- Invited all members of WMI to participate
- Developed a listserv on Yahoo
  - Allows all participants to list resources and references
- Agreed upon regular meeting schedule

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## Focused on Specific Water Reuse Options

- Irrigation
- Cooling towers
- In streams to increase flow and improve fish habitat

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## Public Concerns Regarding Proposed Reuse Projects

- Are treatment options available to ensure EDC-free water?
- Could irrigation with reclaimed water be an EDC pathway to groundwater?
- What is fate of water from cooling towers?
- Would it be safe for fish if creeks are augmented with reused water?

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## Speakers

- Dr. Gerald Ankley, USEPA Duluth
- Dr. David Sedlak, UC Berkeley
- Dr. Gregory Sayles, USEPA ORD
- Dr. John Cicmanec, USEPA ORD
- Dr. Barbara Smith, USEPA Region 9
- Dr. Devra Davis, Carnegie Mellon

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## What Did We Learn?

- The EDC issue is very complicated
  - Incomplete information
  - Thousands of compounds
  - New compounds continuously in development
- No simple inexpensive treatment technology exists to remove all EDCs from water
- Significant fate and transport questions remain
- We must continue to work together to explore answers and opportunities

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## Seeking a Balance Between:

- Weight of Scientific Evidence
  - Wait until sufficient data accumulates to show cause and effect, then commit to action
- Precautionary Principle
  - Avoid practices which have a reasonable potential to cause damage, even when all the facts are not known



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## Future Challenges

- Developing decision-making criteria
  - To reduce the potential for unintended harm
  - In the absence of complete scientific analysis
- Exploring wastewater treatment processes for specific compounds and/or intended water uses
- Communicating feasible and effective pollution prevention strategies
- Educating community leaders and the public

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